

**RFP DGS-2034**  
**TELECOMMUNICATIONS CONSULTING SERVICES**

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**SECTION VIII**

**TECHNICAL REQUIREMENTS**

**A. GENERAL**

This section contains the detailed technical requirements pertaining to the current program as described in **Section III, CURRENT PROGRAM** and bidder options as described in **Section IV, PROPOSED PROGRAM**. All these requirements are mandatory and will be evaluated by the state on the basis of how well a bidder conforms to the state's defined "ideal."

The state has determined that it is best to define its own needs, desired operating objectives, and desired operating environment. The state will not tailor these needs to fit some solution a bidder may propose; rather, the bidder shall propose to meet the state's needs as defined in this RFP. The approach taken here is for the state to define its "ideal" candidate in each consulting category in terms of minimum levels of experience and capabilities; refer to **Section III, CURRENT PROGRAM** for details and definition of terms.

Also see **Section VII, ADMINISTRATIVE REQUIREMENTS** of this RFP, plus **Section IX, COST**, **Section V, PROPOSAL AND BID FORMAT**, and **Section II, RULES GOVERNING COMPETITION** for other requirements that must be met in order to be considered responsive to this RFP.

Note that this section of the RFP is formatted to be a "round-trip" document, i.e., to allow a bidder to respond directly by removing this entire section of the RFP, filling in blanks as appropriate for the categories proposed, copying and completing exhibit forms as appropriate for the categories proposed, and returning this entire section as part of the bidder's **Volume 1**. Any supplemental or reference documentation shall be clearly cross-referenced to the bidder's **Volume 4**.

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**B. BIDDER QUALIFICATIONS - ALL CATEGORIES**

For each telecommunications consulting category that a bidder proposes to offer, the same bid scoring methodology per Section VI, F., apply. References that were used as part of a successful State proposal will be considered (i.e. CMAS, EDP Masters, IT or Telecom Masters). All references must be verifiable. Project references can be utilized to qualify across multiple categories. However, bidders must identify relevance of references to each category bid. Bidders may provide up to five (5) most current references demonstrating the qualifications in the category for which they wish to be considered. Each bidder submission must provide the following information:

1. Client References, (include project description pertaining to categories bid)
2. Client Satisfaction, and
3. Consultant Resumes.

**C. TELECOMMUNICATIONS CONSULTING CATEGORIES****1. VOICE SYSTEMS CONSULTING - LOCAL AREA NETWORK (LAN)****a) Technical Expertise:**

- (1) Needs assessment, system design and/or application engineering:

- (a) Switching options;
  - (i) PBX/PABX
  - (ii) Digital Hybrid Systems
  - (iii) Key Systems
  - (iv) ACD/UCD
  - (v) Voice Processing Systems
    - 1) Auto attendant
    - 2) Voice mail
    - 3) Voice/Speech recognition
    - 4) IVR
  - (vi) Intercom Systems
  - (vii) IP Base Switching
- (b) Distribution/media options:
  - (i) Cable-based (copper and fiber)
    - 1) Buried
    - 2) Aerial
    - 3) Underground
    - 4) Intra-building cable/house wiring

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- 5) Inter-building cable
  - (ii) Wireless
    - 1) Cellular
    - 2) PCS
    - 3) Pager
  - (iii) Multimedia
  - (c) Traffic engineering:
    - (i) Grade of Service
    - (ii) Bandwidth Allocations
    - (iii) Least Cost Routing (LCR)
    - (iv) Automatic Route Selection (ARS)
  - (d) Protocol options, industry standard interfaces:
    - (i) Analog
    - (ii) Digital
    - (iii) Transport protocols
  - (e) Security, as appropriate
- b) Functional Application:
  - (1) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administrative support programs.
  - (2) Review and analyze potential consolidated service options and develop associated business cases.
  - (3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).
  - (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
  - (5) Develop specifications for and oversight of system operations, administration, maintenance, disaster recovery (including automated systems for network management, billing, billing validation and compliance with access to E9-1-1 emergency service).
  - (6) Review, analysis and recommendation of Service Level Agreement (SLA) requirements.
  - (7) Provide independent, generalized telecommunications consulting services to governmental agencies as authorized by DGS-TD for stand-alone telecommunications projects not impacted by consolidated services or contracts.
- c) Required Experience:

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- (1) Performing client telecommunications services product planning, marketing analysis and business case or feasibility study report preparation.
  - (2) Evaluating state procurement practices and the process used by state agencies to procure goods and services.
  - (3) Performing client telecommunications systems needs assessment and analysis, including detail telecommunications service cost analysis, telecommunications equipment/service inventory analysis, alternative telecommunications equipment/services evaluation with appropriate recommendations and review of industry standards applicable to this category; projects must have included procurement of equipment or service on behalf of a government agency and followed the state's guidelines for the telecommunications equipment or services procurement.
  - d) Required Resources: A minimum of 2 (two) full-time professional consulting staff persons is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

## 2. VOICE SYSTEMS CONSULTING - WIDE AREA NETWORK (WAN)

- a) Technical Expertise:
  - (1) Needs assessment, system design and/or application engineering:
    - (a) Switching options:
      - (i) Centrex/Centranet
      - (ii) ISDN
      - (iii) Advanced Intelligent Network (AIN)
      - (iv) Advanced Telecommunications Signaling Systems (ATSS)
      - (v) Intelligent Call Routing (ICR)

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- (vi) Digital facilities/Multiplexers
    - (vii) Frame Relay
    - (viii) Asynchronous Transfer Mode (ATM)
    - (ix) Switching Hierarchy (Class 1- 5)
    - (x) IP Base Switching
  - (b) Distribution/Media options:
    - (i) Cable-based (copper and fiber)
    - (ii) Wireless
    - (iii) Multimedia
  - (c) Traffic engineering:
    - (i) Grade of Service
    - (ii) Bandwidth Allocations
    - (iii) Least Cost Routing (LCR)
    - (iv) Automatic Route Selection (ARS)
  - (d) Protocol options, industry standard interfaces:
    - (i) Analog
    - (ii) Digital
    - (iii) Transport protocols
  - (e) Consolidated Services
  - (f) Security, as appropriate
- b) Functional Applications:
- (1) Review and analyze potential consolidated service options and develop associated business cases.
  - (2) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administration support programs.
  - (3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).
  - (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
  - (5) Develop specifications for and oversight of system operations, administration, maintenance and disaster recovery (including automated systems for network management, billing, billing validation and compliance with access to E9-1-1 emergency service).
  - (6) Review, Analysis and recommendation of Service Level Agreement (SLA) requirements.

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- (7) Provide independent, generalized telecommunications consulting services to governmental agencies as authorized by DGS-TD for stand-alone telecommunications projects not impacted by consolidated services or contracts.
- c) Required Experience:
- (1) Performing client telecommunications services product planning, marketing analysis and business case or feasibility study report preparation.
  - (2) Evaluating state procurement practices and the process used by state agencies to procure goods and services.
  - (3) Performing client telecommunications systems needs assessment and analysis, including detail telecommunications service cost analysis, telecommunications equipment/service inventory analysis, alternative telecommunications equipment/services evaluation with appropriate recommendations and review of industry standards applicable to this category; projects must have included procurement of equipment or service on behalf of a government agency and followed the state's guidelines for the telecommunications equipment or services procurement.
- d) Required Resources: A minimum of 2 (two) full-time professional consulting staff persons is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

1. Client References,
2. Client Satisfaction, and
3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

### 3. DATA SYSTEMS CONSULTING - LOCAL AREA NETWORK (LAN)

- a) Technical Expertise:
- (1) Needs assessment, system design, application engineering:
    - (a) Switching options:
      - (i) Ethernet
      - (ii) Routers

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- (iii) Hubs
- (iv) Servers
- (v) CSU/DSU
- (vi) Gateways
- (vii) Bridges
- (viii) IP Base Switching
- (b) Distribution/Media options :
  - (i) Cable-based (copper and fiber)
  - (ii) Wireless
  - (iii) Multimedia
  - (iv) Microwave
- (c) Traffic Engineering:
  - (i) Bandwidth allocation
  - (ii) Alternate routing
  - (iii) Congestion
  - (iv) Latency
  - (v) Quality of Service (QoS)
- (d) Protocol options, industry standard interfaces:
  - (i) Analog
  - (ii) Digital
  - (iii) Transport protocols
  - (iv) Internet
- (e) Security

b) Functional Applications:

- (1) Review and analyze potential consolidated service options and develop associated business cases.
- (2) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administrative support programs.
- (3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).
- (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
- (5) Develop specifications for and oversight of system operations, administration, maintenance and disaster recovery (including automated systems for network management, billing, and billing validation).

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- (6) Review, analysis and recommendation of Service Level Agreement (SLA) requirements.
- (7) Provide independent, generalized telecommunications consulting services to governmental agencies as authorized by DGS-TD for stand-alone telecommunications projects not impacted by consolidated services or contracts.
- c) Required Experience:
  - (1) Performing client telecommunications services product planning, marketing analysis, business case or feasibility study report preparation,
  - (2) Evaluating state procurement practices and the process used by state agencies to procure goods and services.
  - (3) Performing client telecommunications systems needs assessment and analysis, including detailed telecommunications service cost analysis, telecommunications equipment/service inventory analysis, alternative telecommunications equipment/services evaluation with appropriate recommendations and review of industry standards applicable to this category: projects must have included procurement of equipment or service on behalf of a government agency and followed the state's guidelines for the telecommunications equipment or services procurement.
- d) Required Resources: A minimum of 2 (two) full-time professional consulting staff persons is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**4. DATA SYSTEMS CONSULTING - WIDE AREA NETWORK (WAN)**

- a) Technical Expertise:
  - (1) Needs assessment, system design and/or application engineering:



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- (a) Switching options:
    - (i) Frame Relay
    - (ii) ATM
    - (iii) ISDN- (BRI & PRI)
    - (iv) X.25 network
    - (v) Traditional analog and digital dial-up systems
    - (vi) IP Base Switching
  - (b) Distribution/Media options:
    - (i) Cable-based (copper and fiber)
    - (ii) Wireless
    - (iii) Multimedia
    - (iv) Microwave
    - (v) Satellite
    - (vi) High speed wireless mobile data
  - (c) Traffic engineering:
    - (i) Bandwidth allocation
    - (ii) Alternate routing
    - (iii) Congestion
    - (iv) Latency
    - (v) Quality of Service (QoS)
  - (d) Protocol options, industry standard interfaces:
    - (i) Analog
    - (ii) Digital
    - (iii) Transport protocols
    - (iv) Internet:
  - (e) Security
- b) Functional Applications:
- (1) Review and analyze potential consolidated service options and develop associated business cases.
  - (2) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administration support programs.
  - (3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).
  - (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance

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- (5) Develop specifications for and oversight of system operations, administration, maintenance and disaster recovery (including automated systems for network management, billing, and billing validation).
  - (6) Review, analysis and recommendation of Service Level Agreement (SLA) requirements.
  - (7) Provide independent, generalized telecommunications consulting services to governmental agencies as authorized by DGS-TD for stand-alone telecommunications projects not impacted by consolidated services or contracts.
- c) Required Experience:
- (1) Performing client telecommunications services product planning, marketing analysis, business case or feasibility study report preparation.
  - (2) Evaluating state procurement practices and the process used by state agencies to procure goods and services.
  - (3) Performing client telecommunications systems needs assessment and analysis, including detail telecommunications service cost analysis, telecommunications equipment/service inventory analysis, alternative telecommunications equipment/services evaluation with appropriate recommendations and review of industry standards applicable to this category; projects must have included procurement of equipment or service on behalf of a government agency and followed the state's guidelines for the telecommunications equipment or services procurement.
- d) Required Resources: A minimum of 2 (two) full-time professional consulting staff persons is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

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5. VIDEO SYSTEMS CONSULTING - LOCAL AREA NETWORK (LAN)

a) Technical Expertise:

(1) Needs assessment, system design and/or application engineering:

(a) Switching options:

- (i) Servers
- (ii) Video multiplexers
- (iii) Hubs
- (iv) Routers
- (v) Ethernet
- (vi) Gateway
- (vii) IP Base Switching

(b) Distribution/Media options:

- (i) Cable-based (copper and fiber)
- (ii) Wireless
- (iii) Satellite
- (iv) Multimedia
- (v) Microwave

(c) Traffic Engineering:

- (i) Bandwidth allocation
- (ii) Alternate Routing
- (iii) Congestion
- (iv) Latency
- (v) Quality of Service (QoS)

(d) Protocol options, industry standard interfaces:

- (i) Analog
- (ii) Digital
- (iii) Transport protocols
- (iv) Internet

(e) Security, as appropriate

b) Functional Applications:

- (1) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administration support programs.
- (2) Review and analyze potential consolidated service options and develop associated business cases.
- (3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).

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- (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
- (5) Develop specifications for and oversight of system operations, administration, maintenance, disaster recovery (including automated systems for network management, billing, and billing validation)
- (6) Review, analysis and recommendation of Service Level Agreement (SLA) requirements.
- (7) Provide independent, generalized telecommunications consulting services to governmental agencies as authorized by DGS-TD for stand-alone telecommunications projects not impacted by consolidated services or contracts.
- c) Required Experience:
  - (1) Performing client telecommunications services product planning, marketing analysis and business case or feasibility study report preparation.
  - (2) Evaluating state procurement practices and the process used by state agencies to procure goods and services.
  - (3) Performing client telecommunications systems needs assessment and analysis, including detail telecommunications service cost analysis, telecommunications equipment/service inventory analysis, alternative telecommunications equipment/services evaluation with appropriate recommendations and review of industry standards applicable to this category; projects must have included procurement of equipment or service on behalf of a government agency and followed the state's guidelines for the telecommunications equipment or services procurement.
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.:**

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_  
Reference document: volume, page \_\_\_\_\_

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**6. VIDEO SYSTEMS CONSULTING - WIDE AREA NETWORK (WAN)**

a) Technical Expertise:

(1) Needs assessment, system design and/or application engineering:

(a) Switching options

(i) Videoconferencing

(ii) Closed-circuit systems

(iii) Internet

(iv) Public Safety Terrestrial Mobile Video

(v) IP Base Switching

(b) Distribution/Media options:

(i) Cable-based (copper and fiber)

(ii) Wireless

(iii) Satellite

(iv) Multimedia

(v) Microwave

(c) Traffic Engineering:

(i) Bandwidth allocation

(ii) Alternate routing

(iii) Congestion

(iv) Latency

(v) Quality of Service (QoS)

(d) Protocol options, industry standard interfaces:

(i) Analog

(ii) Digital

(iii) Transport protocols

(iv) Internet

(e) Security

b) Functional Applications:

(1) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administration support programs.

(2) Review and analyze potential consolidated service options and develop associated business cases.

(3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend

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- strategies for improvement (e.g., performance-based alternative procurements).
- (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
  - (5) Develop specifications for and oversight of system operations, administration, maintenance, disaster recovery (including automated systems for network management, billing, and billing validation)
  - (6) Review, analysis and recommendation of Service Level Agreement (SLA) requirements.
  - (7) Provide independent, generalized telecommunications consulting services to governmental agencies as authorized by DGS-TD for stand-alone telecommunications projects not impacted by consolidated services or contracts.
- c) Required Experience:
- (1) Performing client telecommunications services product planning, marketing analysis and business case or feasibility study report preparation.
  - (2) Evaluating state procurement practices and the process used by state agencies to procure goods and services.
  - (3) Performing client telecommunications systems needs assessment and analysis, including detail telecommunications service cost analysis, telecommunications equipment/service inventory analysis, alternative telecommunications equipment/services evaluation with appropriate recommendations and review of industry standards applicable to this category; projects must have included procurement of equipment or service on behalf of a government agency and followed the state's guidelines for the telecommunications equipment or services procurement.
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

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BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**7. RADIO SYSTEMS CONSULTING - TERRESTRIAL MICROWAVE**

a) Technical Expertise:

- (1) Needs assessment, system design:
  - (a) Spectrum analysis, transmit power and frequency selection/coordination:
    - (i) Site selection
    - (ii) Antenna system design
    - (iii) Path profile analysis
    - (iv) Evaluation of propagation reliability
  - (b) Protocol options, interfaces, consolidated services
  - (c) Modulation techniques:
    - (i) Analog
    - (ii) Digital
    - (iii) Video
- (2) Application engineering:
  - (a) Order wire systems
  - (b) Fault alarm
  - (c) Control systems
  - (d) Power plants
  - (e) Digital multiplexers
  - (f) Video compression systems
  - (g) Transmission lines
  - (h) Pressurization systems
  - (i) Baseband treatment systems, including:
    - (i) Active and passive bridges
    - (ii) Hybrids
    - (iii) Filters
  - (j) For analog multiplex systems:
    - (i) Frequency division multiplexing (FDM)
    - (ii) Time division multiplexing (TDM)
  - (k) DS1 or DS3 microwave radio network
  - (l) Satellite telemetry

b) Functional Applications:

- (1) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administration support programs.
- (2) Evaluate and analyze the TD microwave projects such as analog to digital microwave system conversion.

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- (3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).
  - (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
    - (a) Propagation studies
    - (b) Interference resolution
  - (5) Develop specifications for and oversight of system operations, administration, maintenance, disaster recovery.
  - c) Required Experience:
    - (1) Performing client telecommunications systems needs assessment and analysis, including detailed telecommunications service cost analysis, telecommunications equipment/service inventory analysis and alternative telecommunications equipment/services evaluation with appropriate recommendations.
    - (2) Performing client telecommunications systems engineering design, evaluation, selection and/or implementation oversight.
    - (3) Evaluating state procurement practices and the process used by state agencies to procure goods and services.
  - d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.:**

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**8. RADIO SYSTEMS CONSULTING - TRUNKED TECHNOLOGY**

- a) Technical Expertise:
  - (1) Needs assessment, system design, application engineering:
    - (a) Frequency selection and coordination



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- (b) Protocol options, interfaces, consolidated services
  - (c) Modulation techniques:
    - (i) Analog
    - (ii) Digital
- b) Functional Applications:
  - (1) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administration support programs.
  - (2) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).
  - (3) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
    - (a) Propagation studies
      - (i) Site selection
      - (ii) Antenna system design
      - (iii) Frequency selection
      - (iv) Path profile analysis
      - (v) Evaluation of propagation reliability
    - (b) Interference resolution
  - (4) Develop specifications for and oversight of system operations, administration, maintenance and disaster recovery.
- c) Required Experience:
  - (1) Performing client telecommunications systems needs assessment and analysis, including detailed telecommunications service cost analysis, telecommunications equipment/service inventory analysis and alternative telecommunications equipment/services evaluation with appropriate recommendations.
  - (2) Evaluating state procurement practices and the process used by state agencies to procure goods and services
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

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1. Client References,
2. Client Satisfaction, and
3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**9. RADIO SYSTEMS CONSULTING - FIXED BASE & MOBILE** (may be land-based, maritime, aircraft or remotely-sensed telemetry systems)

a) Technical Expertise:

- (1) Needs assessment, system design:
  - (a) Spectrum analysis, transmit power and frequency selection/coordination:
    - (i) Site selection
    - (ii) Antenna system design
    - (iii) Path profile analysis
    - (iv) Evaluation of propagation reliability
  - (b) Protocol options, interfaces, consolidated services
  - (c) Modulation techniques:
    - (i) Analog
    - (ii) Digital
    - (iii) Video
- (2) Application engineering; including:
  - (a) Large and small dispatch consoles
  - (b) Computer-aided dispatch systems
  - (c) Receiver voting systems
  - (d) Simulcast systems
  - (e) Vehicular location systems
  - (f) Mobile data systems
  - (g) Public address systems
  - (h) Control/repeater stations using DC and tone control methods
  - (i) Local controlled base stations
  - (j) Remote controlled base stations using DC and tone controlled methods
  - (k) Mobile relay stations
  - (l) Vehicular repeater systems
  - (m) Voice encryption systems used in public safety environment
  - (n) Communications antenna systems
  - (o) Public safety operations and public safety bands:
    - (i) Frequency selection and coordination

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- (ii) Protocol options, interfaces, consolidated services
  - (p) Satellite
  - (q) Telemetry
- b) Functional Applications:
  - (1) Review and analyze the existing telecommunications network infrastructure, consolidated services platform, network operations and maintenance, and administration support programs.
  - (2) Evaluate and analyze the DGS-TD mobile radio projects such as mobile radio site surveys.
  - (3) Analyze impact of existing procurement practices on DGS-TD's ability to effectively respond to agencies changing or developing telecommunications requirements; recommend strategies for improvement (e.g., performance-based alternative procurements).
  - (4) Develop specifications for and oversight of system/infrastructure installation, implementation, compliance/acceptance
    - (a) Propagation studies
      - (i) On-the-ground field intensity measurements
      - (ii) Computerized propagation modeling
    - (b) Interference resolution
  - (5) Develop specifications for and oversight of system operations, administration, maintenance, disaster recovery
- c) Required Experience:
  - (1) Performing client telecommunications systems needs assessment and analysis, including detailed telecommunications service cost analysis, telecommunications equipment/service inventory analysis and alternative telecommunications equipment/services evaluation with appropriate recommendations.
  - (2) Performing client telecommunications systems engineering design, evaluation, selection and/or implementation oversight.
  - (3) Evaluating state procurement practices and the process used by state agencies to procure goods and services
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

**TELECOMMUNICATIONS CONSULTING SERVICES**

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1. Client References,
2. Client Satisfaction, and
3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**10. TECHNOLOGY MANAGEMENT CONSULTING - EVALUATION OF EVOLVING TECHNOLOGIES**

a) Technical Expertise:

- (1) Wireless Technology
  - (a) Wireless LAN
  - (b) Wireless WAN
  - (c) Wireless Media
  - (d) Wireless Internet/Web
  - (e) Wireless Communications
    - (i) Cellular
    - (ii) PCS
    - (iii) Multimedia
- (2) IP Telephony
  - (a) IP-based LAN
  - (b) IP-based WAN
  - (c) IP-based VPN/MPLS
  - (d) Internet
  - (e) VOIP
  - (f) IP Centrex
  - (g) IP Security
- (3) Standards and applications related to voice, data and video
- (4) Converged Technology
- (5) E-Commerce/E-Service
- (6) GIS applications
- (7) GPS technology and applications
- (8) Interconnection/interoperability of disparate systems
- (9) Voice activation systems (i.e. public safety vehicles)
- (10) Biometrics (voice identification, finger print, retinal scan)
- (11) Number Portability
- (12) Next Generation Networks (NGN) strategies
- (13) Free Space Photonics based on DWDM

b) Functional Applications:

- (1) Assist in the assessment of single number calling, number portability and development of local area competition strategies which identify the impacts to the existing

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- consolidated services platforms and timing of competitive evaluation for maximum benefit to the state.
- (2) Identify and evaluate technology or contract services, as appropriate, to serve customer needs in the areas of cellular, PCS, broadband and multimedia within the consolidated services program.
  - (3) Develop a multi-user telecommunications network interface standards matrix, which can be utilized by governmental agencies and DGS-TD to ensure compatibility between the consolidated services network interface and the agencies applications interface.
  - (4) Review, analysis and recommendation of Service Level Agreement (SLA) requirements.
  - (5) Analysis of comparative product life cycle
- c) Required Experience:
- (1) Performing client telecommunications services needs assessments and analysis, including detail telecommunications cost analysis and alternative telecommunications equipment/services evaluation with appropriate recommendations.
  - (2) Reviewing technology design, evaluating field trials through quality assurance, making recommendations for selection and implementation.
  - (3) Evaluating telecommunications standards and appropriate protocols for client applications; the projects should include recommendations for and the rationale related to the selection of the specific standard and/or protocol.
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.:**

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

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**11. TECHNOLOGY MANAGEMENT CONSULTING - STRATEGIC PLANNING**

- a) Technical Expertise:
  - (1) Consolidated services
  - (2) Network infrastructure alternatives and combinations
  - (3) Marketing analysis methods
  - (4) Qualification in one (1) or more of this RFP's telecommunications consulting categories 1 through 10 or 16.
  - (5) Engineering Management Planning
- b) Functional Applications:
  - (1) Review and analyze potential consolidated service options and develop associated business cases.
  - (2) Assist in the development of a strategic long range telecommunications plan which provides the most effective, synergistic network infrastructure to support telecommunications needs of/between governmental agencies, within the State of California, and the most effective, synergistic interface to the public networks.
  - (3) Review, evaluate and recommend interactive program tools that allow comparative analysis between services, technological alternatives, functionality and costs.
  - (4) Assist in the development of marketing strategies and market area analyses as applied to the consolidated services telecommunications program, telecommunications infrastructure, product/service offerings, and competition both present and proposed for the long-range plan.
- c) Required Experience:
  - (1) Performing client telecommunications services product planning, marketing analysis and business case or feasibility study report preparation.
  - (2) Developing strategic long-range telecommunications plans for clients; the planning document provides the client with a strategic direction which forecasts a future period of three (3) to five (5) years, and clearly identifies benefit/risk analysis, assumptions, alternatives, anticipated financial impacts between alternatives and supports the recommendation with appropriate rationale.
  - (3) Conducting evaluation, selection and training related to telecommunications software products that enhance engineering economic analysis, equipment/service inventory analysis and comparative analysis between telecommunications equipment/services alternatives.

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- (4) Performing client telecommunications service market area analysis; the project(s) involve multiple client work locations spread over a wide geographical area, i.e., multiple Local Access Transport Areas (LATAs) and identify the recommended telecommunications service serving pattern(s).
  - d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_  
 Reference document: volume, page \_\_\_\_\_

## 12. TECHNOLOGY MANAGEMENT CONSULTING - PROJECT MANAGEMENT

- a) Technical Expertise:
  - (1) State project approval process, including the development of all related document formats.
  - (2) Qualification in one (1) or more of this RFP's telecommunications consulting categories 1 through 11 or 13 through 18.
- b) Functional Applications:
  - (1) Review and analyze benefits of existing and potential future state master contracts (e.g., performance-based alternative procurements) for telecommunications goods and services.
  - (2) Assist in developing Feasibility Study Reports (FSRs) on potential telecommunications network/service partnerships (joint interagency agreements) between DGS and other governmental agencies that identify and quantify the benefits to all parties associated with such agreements.
- c) Required Experience:
  - (1) Performing telecommunications equipment and services contract review and or preparation, including the evaluation of existing governmental agency telecommunications

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- contracts for modification and re-bid or the development of technical/administrative specifications for review by governmental agencies for new contracts.
- (2) Developing telecommunications equipment and/or service agreements between two (2) or more governmental agencies; the projects must have included negotiations with an equipment or service provider on behalf of the governmental agencies.
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.:**

1. Client References,
2. Client Satisfaction, and
3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**13. TECHNOLOGY MANAGEMENT CONSULTING - TRAINING**

- a) Technical Expertise:
- (1) Technical training methodologies
  - (2) Qualification in one (1) or more of this RFP's telecommunications consulting categories 1 through 10 or 16.
- b) Functional Applications:
- (1) Review, evaluate and/or develop telecommunications seminars and training programs to be offered to DGS-TD planning, engineering, operations, customer service and support staff and other governmental agencies within the State of California. The range of participants may range from executive level management through clerical support staff with various levels of technical knowledge of the telecommunications industry.
- c) Required Experience:
- (1) Developing and/or conducting telecommunications equipment and/or service subject matter related seminars; also, evaluating, developing and/or selecting



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- (procurement), presentation of telecommunications instructional material to governmental agencies.
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

1. Client References,
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3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**14. TECHNOLOGY MANAGEMENT CONSULTING - BUSINESS PRACTICES AND PROCEDURES**

- a) Technical Expertise:
- (1) Governmental agency procedures and practices related to telecommunications services provisioning.
  - (2) DGS-TD procedures and practices
  - (3) Qualification in one (1) or more of this RFP's telecommunications consulting categories 1 through 10 or 16.
- b) Functional Applications:
- (1) Review and analyze the DGS-TD procedures and business practices for implementation, support ongoing management and agency use of State of California consolidated telecommunications services by governmental agencies.
  - (2) Business Process Review and analysis of governmental agency practices and procedures for implementation, support and ongoing management of telecommunications services.
- c) Required Experience:
- (1) Performing telecommunications network systems/services implementations planning, tactical telecommunications network operations or management plans, which include development of the appropriate methods and procedures.
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

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The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

1. Client References,
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3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**15. TECHNOLOGY MANAGEMENT CONSULTING -  
REGULATORY AND GOVERNMENTAL ISSUES**

a) Technical Expertise:

- (1) Regulatory climate for telecommunications
- (2) California Legislative climate for telecommunications
- (3) State project approval process, including the development of all related document formats
- (4) Qualification in one (1) or more of this RFP's telecommunications consulting categories 1 through 10 or 16.

b) Functional Applications:

- (1) Review and analyze state and federal regulatory telecommunications climate and identify impact on state programs.
- (2) Review and analyze state legislative climate for impact on telecommunications strategic direction or programs/services in the areas of telecommunications/information systems.
- (3) Assist in developing Feasibility Study Reports (FSRs) on potential telecommunications network/service partnerships (joint interagency agreements) between DGS and other governmental agencies that identify and quantify the benefits to all parties associated with such agreements.

c) Required Experience:

- (1) Performing client related telecommunications regulatory review, analysis with recommendations to and or for governmental agencies (examples would be the presentation of a rate case/position paper to the CPUC or the review of technical specifications documents for the FCC.

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- (2) Performing telecommunications related legislative review, assessment and analysis, for client(s); final project documents have included telecommunications equipment/services impact position papers, with appropriate recommendations.
- (3) Developing telecommunications equipment and/or service agreements between two (2) or more governmental agencies; the projects must have included negotiations with an equipment or service provider on behalf of the governmental agencies.
- d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.:**

- 1. Client References,
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BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

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**16. TECHNOLOGY MANAGEMENT CONSULTING - PUBLIC SAFETY, E9-1-1**

- a) Technical Expertise:
  - (1) Public safety requirements, applicable State and Federal laws and legislation for wireless and wireline E9-1-1
  - (2) Industry/Application standards for wireless and wireline E9-1-1 and applicable standards for security, reliability and quality
  - (3) Knowledge of carrier database services for automatic number identification (ANI) and automatic location identification (ALI)
  - (4) Wireless networks: GSM, PCS Protocols
  - (5) Geographic Information System (GIS) design, application, and integration for E9-1-1 functions
  - (6) GPS technology and applications for E9-1-1
  - (7) CAD systems at public safety answering points (PSAPs)
  - (8) Telematics and related interfaces to public safety needs (i.e. XML, IETF Standards)
  - (9) E9-1-1 network protocols and configurations for wireline and wireless

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- (10) Number Portability regulation and technologies for wireline and wireless E9-1-1 (Local, Global)
- (11) Non-Emergency Abbreviated Dialing
- b) Functional Applications:
  - (1) E9-1-1 Network
    - (a) Evaluate and analyze protocol emulation and interface standards for E9-1-1 projects.
    - (b) Evaluate public safety program and telecommunications network services requirements.
    - (c) Architecture planning requirements
    - (d) Management Information Systems for network analysis, statistics, monitoring, and escalations
    - (e) Development of Service Level Standards
    - (f) Network security
    - (g) County Coordinator role related to E9-1-1
  - (2) Geographic Information System (GIS) for E9-1-1
    - (a) Software integration and maintenance
    - (b) Dataset development, integration, and maintenance
    - (c) Hardware set up and system integration at PSAPs
    - (d) System integration and management of emergency service numbers (ESNs)
    - (e) Telematic integration
    - (f) ESRI Arc/Info and Arc/View and future GIS applications for E9-1-1
    - (g) Remote access interfaces
    - (h) Security interfaces
  - (3) PSAP and Interfaces for E9-1-1
    - (a) Management Information Systems for call statistics
    - (b) Computer Aided Dispatch and associated system integration
    - (c) Interface guidelines for customer premise equipment
  - (4) E9-1-1 Business Support
    - (a) Management Information System for accounting and equipment inventory
    - (b) Database routing management and updates
    - (c) Client/Server development of critical E9-1-1 systems
    - (d) Security analysis and oversight
    - (e) E9-1-1 independent verification and validation to audit service providers
    - (f) Quality management practices
- c) Required Experience:
  - (1) Performing client telecommunications systems engineering design and analysis for E9-1-1.
  - (2) Defining service level standards for network, PSAPs, GIS, and business operations for E9-1-1.

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- (3) Performing evaluation and selection of E9-1-1 services.
  - (4) Performing implementation of E9-1-1 wireless and wireline services for network, switching, and feature design.
  - (5) Performing GIS programming and dataset development for E9-1-1.
  - (6) Performing development and oversight of E9-1-1 services.
  - (7) Reviewing state and federal mandates which define the public safety program
  - d) Required Resources: A minimum of 1 (one) full-time professional consulting staff person is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.:**

- 1. Client References,
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- 3. Consultant Resumes

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

# 17. ELECTRICAL ENGINEERING, POWER SYSTEMS CONSULTING

- a) Technical Expertise:
  - (1) Systems design of AC power systems utilizing commercial power and propane/diesel/fuel cell powered generators as primary and/or back-up power sources. Generators, if used, typically are in the 3-10 KVA range.
  - (2) Systems design of uninterruptible power systems (UPS). The consulting firm shall have additional experience in the use of electro-mechanical transfer and static transfer inverters.
  - (3) Transfer switching between primary and back-up AC power sources.
  - (4) AC power transient protection.
  - (5) Systems design of DC power systems utilizing thermo-electrical generators (TEGs), solar arrays, and wind generators in the communications environment.
  - (6) Systems design of DC power systems utilizing 12, 24, and 48 volt battery banks in the communications environment. The consulting firm should have experience with both liquid-electrolyte and gelled-electrolyte lead-calcium type

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- batteries up to 1000 AH capacity (8-hour rate) and with batteries operated in the float and deep-discharge modes.
- (7) AC and DC power distribution within the facility.
- (8) HVAC analysis and design for communications vaults.
- (9) Systems design of ground systems used for lightning protection and as a grounding electrode.
- (10) All telecommunications consulting deliverables will be in full compliance with applicable engineering standards, safety codes and other legal requirements, as appropriate.
- b) Functional Applications:
  - (1) Provide comprehensive design and installation engineering.
- c) Required Experience:
  - (1) Reviewing and analyzing the existing telecommunications platform, network operations, and maintenance and administrative support programs.
  - (2) Conducting needs assessment, if required, or analyzing needs assessment finding of state staff.
  - (3) Assisting with or conducting a feasibility study.
- d) Required Resources: A minimum of 1 (one) full-time professional staff person acting to ensure compliance with the Professional Engineers' Act is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.:**

- 1. Client References,
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- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_

**18. STRUCTURAL ENGINEERING CONSULTING**

- a) Technical Expertise:
  - (1) Analysis of antenna, ice, and wind load effects on communications towers (including wood pole structures). The consulting firm shall have experience in performing a load analysis on both guyed and self-supporting towers.
  - (2) Design and construction of support bases for communications antenna structures and for guy-wire anchors.

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- (3) Design of cable runway systems.
- (4) Earthquake safety considerations in the design of communications vaults, antenna towers, and other structures in all seismic zones of California.
- (5) All telecommunications consulting deliverables will be in full compliance with applicable engineering standards, safety codes and other legal requirements, as appropriate.
- b) Functional Applications:
  - (1) Provide comprehensive design and installation engineering.
- c) Required Experience:
  - (1) Reviewing and analyzing the existing telecommunications platform, network operations, and maintenance and administrative support programs.
  - (2) Conducting needs assessment, if required, or analyzing needs assessment finding of state staff.
  - (3) Assisting with or conducting a feasibility study.
- d) Required Resources: A minimum of 1 (one) full-time professional staff person acting to ensure compliance with the Professional Engineers' Act is required for this category; proposed subcontractors are included.

The bidder must have the knowledge and ability to provide telecommunications consulting service as defined in this category and shall provide the following documentation per the instructions in **Section VI, F.**:

- 1. Client References,
- 2. Client Satisfaction, and
- 3. Consultant Resumes.

BIDDER MEETS REQUIREMENT: YES \_\_\_\_\_ NO \_\_\_\_\_

Reference document: volume, page \_\_\_\_\_